Project Proposal: Intelligent container

Group Number: Thursday_Group2

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I. Background

Case study:

In real life, customers will always be trapped into trouble where one constantly forgets to purchase rice after the rice barrel empting out for a long time. The network alternatively being an efficient channel to convey customers' requests directly to the retailer, we briefly conceived an idea to implement the above procedure, from detecting to refilling based on IOT building, intelligently and conveniently.

Academic background:

Inspired by RFID system, where the RFID can be replaced by environment condition parameter, say the light, with the reader turning as sensor as well. Data detected will also be collected and uploaded via BLE on cloud, where the advanced computing and clarification will be carried on. In trust of licensed online payment system, customers' account may keep active and issue the payment quickly. Ultimately, the connecting rice retailers will be informed, just like what happens in EPC network and feedback system will also be established. The whole system is designed to simplify the user case for rice-out-pursuit-problem and relieve the commuters' burden.

More on sensor:

In this product, we choose photosensitive sensor as major detector, while pressure sensitive sensor makes an alternative. With the rice using up, sensor placed onto the bottom of barrel will sense the change and processes the signal as soon as possible.

II. Objectives

- To detect the degree range for photosensitive sensor when the environment changes, especially find out the critical point.
- To modify the BLE/router configuration and make it compliable with the sensor.
- To set up and arrange database and compile a website which will be directly used as user interface.
- To provide the cloud service and set up connection with the remote retailers. (This step may not be implemented within this project due to the time limit, economic cost etc.)
- To monitor the working flow of whole system comprehensively and debug.

IV. Specification

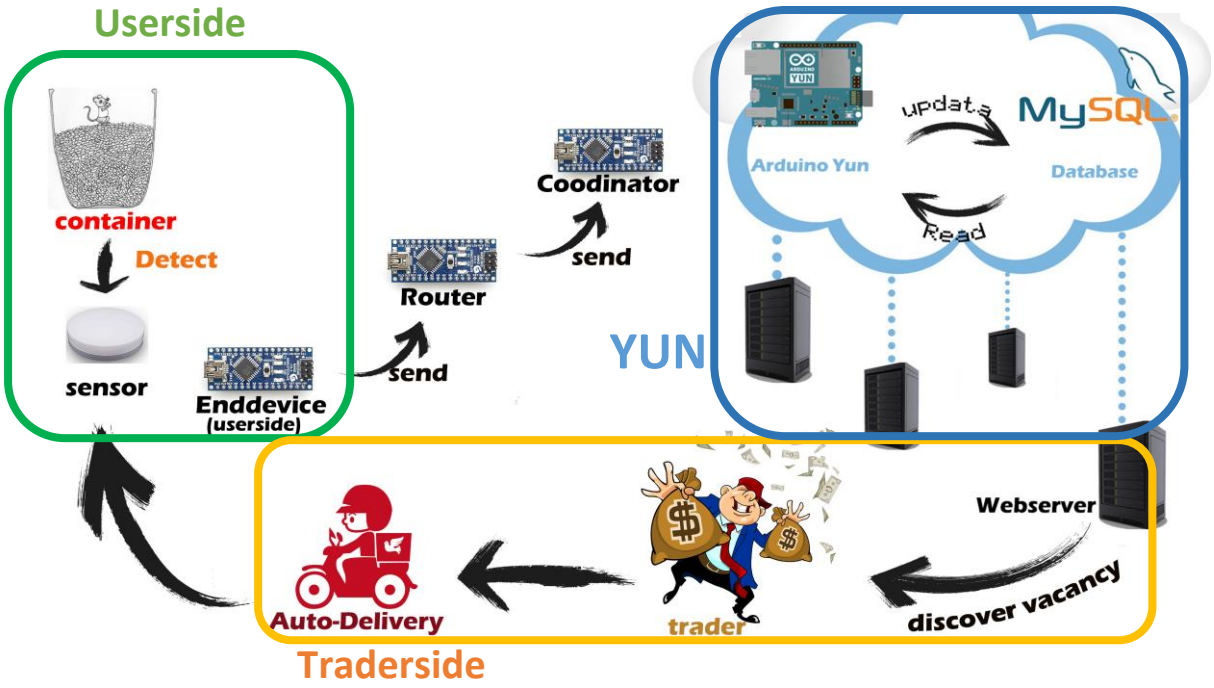

Figure 1: The whole system model: The sensor on the userside will detect whether the container is empty or research some limit or not. After detecting Enddevice nano will send the information though the wireless line using BLE to the coordinator nano. The coordinator will upload information onto database on YUN, and the webserver on the traderside will periodically refresh its cache and post the latest information on the website, which can notice the corresponding traders to deliver his good to the user automatically.

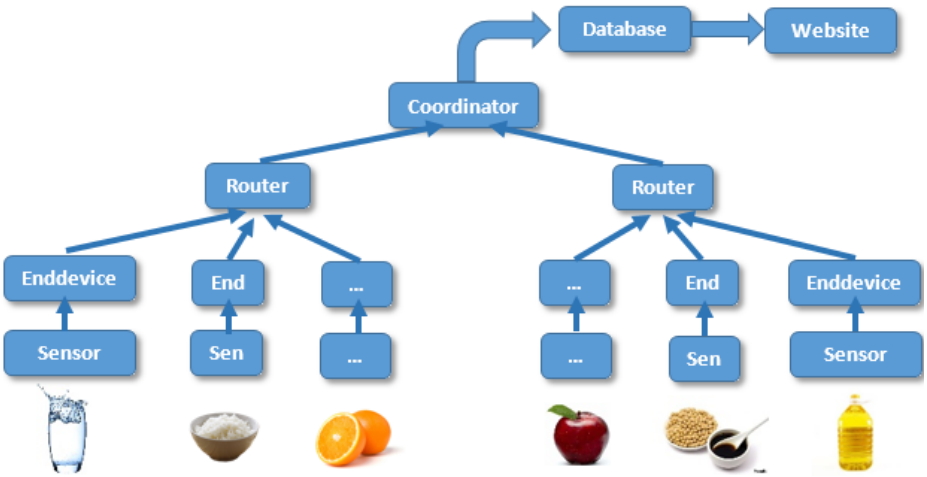

Figure 2: The dataflow simulation: The dataflow and subordinate relationship is like above figure. The coordinator connect the userside and the YUN. The information communication on the YUN makes all this project staff works. And because of the power of the server and network nowadays. One coordinator can supports many users, and it can also publish his information to many different database, which can much increase the number of chooses for the users.

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V. Timeframe

	Description of Work	Start and End Dates
Phase One	Proposal: I. Discuss about the project details and make a reasonable timeline.	March 16 --- March 21 (Week 10)
Phase Two	Principle review & background learning: I. Review the ZigBee protocol and learn something necessary from the sensor specification. II. Review the basic configuration of the website building and the basic application of the database	March 22 --- March 28 (Week 11)
Phase Three	Hardware & software configuration I. Configure and set up the system containing the Arduino Nano, Yun, BLE. II. Set up one webserver. III. Configuration a database and apply it on the webserver. IV. Combine the webserver database with the Arduino Yun.	March 29 --- April 1 (Week 12 & 13)
Phase Five	Test & code modification I. Debug for the testament. II. Cover several real tests. III. Adjust the best sensor parameters, the update period of database and something related.	April 12 --- April 18 (Week 14)
Phase Six	Demonstrate website I. Build the demonstrate website	April 19 --- April 25 (Week 15)

VI. Key Stakeholders

Client	LI, Haocheng (SID: 1155047102), Xu, Jinhan (SID: 1155046948)
Sponsor	CUHK, Information Engineering department
Project manager	Mr. Alex Siu

VII. Monitoring and Evaluation

We attempt to monitor the performance of

a. Photosensitive sensor, whether it's sensitive and flexible enough.

b. BLE network, whether it's efficient and stable.

c. Website, whether it's well linked the user's account and acts ideally.

d. Database management, whether it's well formatted and meets customers' demand.

IIX. Approval Signatures

[Name], Project Client [Name], Project Sponsor [Name], Project Manager